

**COLLOPS HIRTELLUS (COLEOPTERA:
MELYRIDAE) MALES AND FORMICA SPP.
(HYMENOPTERA: FORMICIDAE) ATTRACTED
BY A WOOD PRESERVATIVE.^{1,2}**

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ABSTRACT: Experiments using a wood preservative as an attractant for male *Collops hirtellus* LeConte and *Formica* spp. were conducted near Moscow, Idaho in 1982 and 1983. Male *C. hirtellus* beetles and alate *Formica* spp. were attracted to the traps treated with the wood preservative. Further research is needed to identify the attractant.

On June 17, 1982, aggregations of male Melyridae beetles, *Collops hirtellus* LeConte, were reported in northern Idaho, one each in Lewiston and Moscow. The beetles were swarming around houses so thickly that they were a nuisance. In June, 1983, beetles aggregated again at Moscow. In all instances, sun decks or other surfaces had been treated recently with a wood preservative.⁴

Members of the genus *Collops* have been reported to be predators of many economically important insect species. For example, these beetles feed on eggs of chinch bugs, stink bugs, boll weevils and cotton bollworm (Walker 1957). However, the effectiveness of these predators is not well known.

Flint et al. (1979) reported that *Collops vittatus* (Say) was attracted to a terpenoid compound, caryophyllene oxide, which is produced by the foliage of the cotton plant. They believed that *C. vittatus* used the terpenoid as a habitat-finding mechanism. Furthermore, in 1981 Flint et al. reported that male *C. vittatus* were strongly attracted to a caryophyllene alcohol extract.

Experiments were conducted in 1982 and 1983, to verify the attractiveness of this wood preservative to male *C. hirtellus*.

METHODS AND MATERIALS

In both 1982 and 1983 four trap sites were located within a six mile radius of Moscow, Idaho as follows: site 1, near alfalfa and grass hay fields; site 2, in an alfalfa field; site 3, on the University of Idaho Parker Farm

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⁴Clear Wood Preservative, Olympic Stain, a division of Clorox Company.

which had various crops in small fields; and site 4, in a small grass hay field on the edge of a wheat field.

In 1982 aphid traps were modified to capture the beetles. The traps consisted of five 2.8 liter tin cans affixed to an upright 5 x 10 x 243 cm wood stud. The cans were equally spaced on the stud. Green blotter paper was taped to each can, completely covering the outer surface. Stickem Special was applied in four 3.8 cm wide vertical strips, each centered on one of the ordinal sides of each can. The remainder of the blotter paper (1651 cm²) was then saturated with the wood preservative. Control traps were prepared similarly without the wood preservative, and placed ca. 10 m from the treatment traps. On June 22, the wood preservative was applied and observations were made daily over a six day period. The beetles were removed daily from the traps, then counted and sexed.

In 1983 different traps were used. These traps were scolytid pheromone traps as described by Furniss (1981). An 855 cm² circular section of blotter paper was attached to the trap top to which preservative was applied. The wood preservative was reapplied on July 12 after a rain and insects were recorded and removed from trays daily until July 18.

On July 12, in a preliminary test, numerous alate male ants, *Formica* spp. (Hymenoptera: Formicidae) were caught in preservative-treated traps. After this observation, *Formica* spp. were counted along with *C. hirtellus* during subsequent testing, July 12-18 and July 19-25.

Chi square statistics were computed to estimate the probability that the observed proportions of beetles and ants collected in treatment traps were due to chance.

RESULTS AND DISCUSSION

A total of 4068 *C. hirtellus* were trapped in 1982 and 1983. Of these, only 16 were female. Furthermore, of the 16 females trapped, no significant preference for treatment or control traps was detected, whereas the numbers of male *C. hirtellus* on the treated traps were significantly higher than those on the control traps ($P < 0.005$) (Table 1). More beetles were caught per trap in 1982 than 1983. This may be due to any of several factors. The number of beetles caught may be a function of area treated with the wood preservative, the design of the trap, the behavior of the beetle, weather during the test, population density or a combination of several of these factors.

In both years, beetles were observed flying upwind toward the traps. Many beetles flew into the traps while others landed nearby then started moving up and down the vegetation in the area. The traps used in 1982 allowed these beetles to walk up the stud and become trapped. However, in 1983 the traps used were designed as flight traps to be used without Stickem Special. Few, if any, beetles walked into these traps.

The total number of beetles trapped per day at all sites indicate that in 1983 the attractiveness of wood preservative declined very rapidly after the application (Table 2). However, in 1982 the beetle catch per day peaked on day two and then started to decline. In 1983, 0.38 in. precipitation fell on the 2nd day, which might account for the low numbers trapped after that date.

Table 1. Total number of male *Collops hirtellus* trapped at four sites near Moscow, Idaho during six one-day periods in 1982 and 1983.

SITE	June 22-27, 1982		July 13-18, 1983	
	Trt ⁵	Control	Trt ⁵	Control
1	861	3	125	3
2	1025	8	169	2
3	576	4	43	0
4	1206	4	39	0
Total	3668	19	376	5

Table 2. Daily counts of *Collops hirtellus* trapped at four sites combined during six one-day periods in 1982 and 1983.

DAY	1982		1983	
	Trt ⁵	Control	Trt ⁵	Control
1	876	1	351	3
2	1911	6	10	1
3	658	7	8	0
4	122	2	5	1
5	76	2	2	0
6	34	1	0	0

Table 3. Total number of male *Formica* spp. trapped at four sites near Moscow, Idaho during two six day periods in 1983.

SITE	7/12/83 - 7/18/83		7/19/83 - 7/25/83	
	Trt ⁵	Control	Trt ⁵	Control
1	53	5	0	0
2	33	3	8	0
3	77	1	81	6
4	6	0	4	0
Total	169	9	93	6

⁵All treatments were significantly more attractive according to a Chi-Square test ($P \leq 0.05$).

Table 3 shows the number of alate male *Formica* spp. caught in the treated traps as compared to the control trap during two six day intervals in 1983. These results indicate that a significantly ($P \leq 0.05$) higher number of *Formica* spp. males occurred on the treated traps as compared to the controls. The reason for the *Formica* catch in 1983 and not in 1982 may be that the later trapping periods in 1983 coincided with their flight period.

At this point, any hypothesis as to the identity of the semiochemical(s) present in the wood preservative which attracted the *Collops* and *Formica* would be pure speculation. However, the wood preservative contains two "active" ingredients: Bis (Tributyltin) Oxide and N-trichloromethyl thiophthalimide. According to the label, these compounds constitute 1.0% of the formulation, each at 0.5%. The remaining 99% of the formulation is considered to be inert by the manufacturer. However, there could be biologically active compounds in the inert portion of the wood preservative.

More research into this phenomenon is needed. The primary object should be to identify the semiochemicals present in this wood preservative for both *C. hirtellus* and *Formica* spp. Once this objective is met, important biological and economic applications involving survey and management of these insect populations may be possible (Jackson and Lewis, 1981).

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